CPS SC Series Grid-tied PV Inverter

CPS SC14KTL-DO/US-208

CPS SC20KTL-DO/US-480

Installation and Operation Manual

Version 1.4

CHINT POWER SYSTEMS AMERICA CO., LTD.

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Before You Start…

This manual contains important information regarding installation and safe operation of this unit. Be sure to read this manual carefully before using.

Thanks for choosing this CPS Grid-tied PV Inverter. This PV Inverter is a high performance and highly reliable product specifically designed for the North American Solar market.

If you encounter any problems during installation or operation of this unit, first check this manual before contacting your local dealer or supplier. Instructions inside this manual will help you solve most installation and operation difficulties.

Please keep this manual on hand for quick reference.

Chapter 1 IMPORTANT SAFETY INSTRUCTIONS (SAVE THESE INSTRUCTIONS)

Please read this user manual carefully before product installation. CPS reserves the right to refuse warranty claims for equipment damage if the user fails to install the equipment according to the instructions in this manual.

Warnings and symbols in this document

	DANGER: DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
	WARNING: WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
	CAUTION: CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	NOTICE: NOTICE indicates a hazardous situation which, if not avoided, could result in equipment working abnormally or property loss.
	INSTRUCTION: INSTRUCTION indicates important supplementary information or provides skills or tips that can be used to help you solve a problem or save you time.

Markings on the product

	HIGH VOLTAGE: The product works with high voltages. All work on the product must only be performed as described in this document.
	HOT SURFACE: The equipment is designed to meet international safety standards, but surfaces can become hot during operation. Do not touch the heat sink or peripheral surfaces during or shortly after operation.
	EARTH GROUND: This symbol marks the location of grounding terminal, which must be securely connected to the earth through the PE (protective earthing) cable to ensure operational safety.

DANGER:

Please disconnect the inverter from AC grid and PV modules before opening the equipment. When the PV array is exposed to light, it supplies DC voltage to this equipment. Make sure hazardous high voltage and energy inside the equipment has been discharged.

Do not operate or maintain the inverter until at least 10 minutes after disconnecting all sources from DC and AC sides.

WARNING:

All the installation and wiring connections should be performed only by qualified technical personnel. Disconnect the inverter from PV modules and the Power Grid before maintaining and operating the equipment.

CAUTION:

CPS SC20KTL-DO/US-480 & SC14KTL-DO inverter is approx **63kg (≈132 pounds)**.

Please ensure the mounting is properly installed before hanging the the inverter on the bracket.

CAUTION:

CPS SC20KTL-DO/US-480 & SC14KTL-DO series inverter have the Arc Fault Detection feature in the disabled mode by default. Please ensure that this setting meets local code requirements. If you need to enable this feature for your install then please call our HOTLINE: 855-584-7168, or contact your local sales or service manager for assistance.

NOTICE:

This inverter is designed to connect AC power only to the public grid. Do not connect the AC output of this equipment directly to any private AC power equipment.

INSTRUCTION:

Conduits shall be used as the cable protectors for wire connection.

Chapter 2 Overview

2.1 Inverter for grid-tied PV systems

CPS SC20KTL-DO/US-480 & SC14KTL-DO inverter is suitable for use with various commercial rooftop systems and distributed power station systems. Normally, the system mainly consists of PV modules, DC power distribution equipments, PV inverter and AC power distribution equipments (Figure 2-1). The inverter converts the DC from PV modules to AC with the same frequency and phase as the AC grid. All or part of the AC power is supplied to local loads, and the surplus power is supplied to the electricity grid.

Figure 2-1 Grid-tied PV system

2.2 Product type description

CPS SC20KTL-DO/US-480 & SC14KTL-DO is a two-MPPT PV inverter integrated with the DC and AC switches for indoor and outdoor application. The suffix “US” means that this model of inverter passes the UL certification and is specialized for the American market.

2.3 Product features

CPS SC20KTL-DO/US-480 & SC14KTL-DO inverter incorporates the advanced 3-level and MOSFET paralleled with IGBT technology to minimize the energy loss. Meanwhile, the arc-fault detection (AFD) function is added to meet the requirements of UL1699B for DC arc.

The two-MPPT design has the benefit of increasing the power generating efficiency of the whole PV system. The inverter has 2 MPPTs, so a separate array can be controlled by an independent Maximum Power Point Tracking (MPPT) control circuit. This means that the two arrays can be installed in different positions and orientations.

The transformerless design of inverter with the benefit of small size, light weight and high power density, provides the best cost performance for the whole PV system.

The inverter is available for both indoor and outdoor applications due to its NEMA 3R (IP65) protection class enclosure.

Integrated AFCI (Arc Fault Circuit Interruption) feature enables the need to meet advanced local electrical and grid codes. This feature is disabled by default but can be enabled if needed in the field. Please contact CPS at HOTLINE: 855-584-7168 number to get instructions.

The integrated DC and AC switches make the maintenance more flexible and safer. Besides, the inverter has the function to support one or two independent MPPTs input to improve the system efficiency. Meanwhile, the inverter can automatically identify the connection way between PV modules due to its excellent self-adaption ability.

2.4 Circuit structure design

The basic schematic diagram of CPS SC20KTL-DO/US-480 & SC14KTL-DO is shown in Figure 2-2. The input DC passes through surge protection circuitry, AFD circuit，DC EMI filter, and the boost circuit to achieve maximum power tracking and boost up voltages. The arc-fault detection (AFD) is a device that can provide arcing protection for the PV system and wiring against the unwanted effects of arcing by enabling an interruption or shorting device to interrupt power delivered to an arcing fault. The inverter converts the DC energy to 3-phase AC energy. The high frequency components of AC

voltage are removed with a line filter. Then the 3-phase AC energy is sent through two-stage relays and EMI filter to produce high quality AC power.

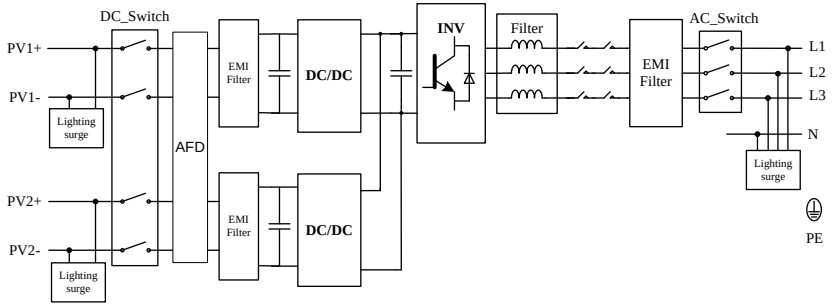


Figure 2-2 Schematic diagram of CPS SC20KTL-DO/US-480 & SC14KTL-DO

2.5 Appearance description

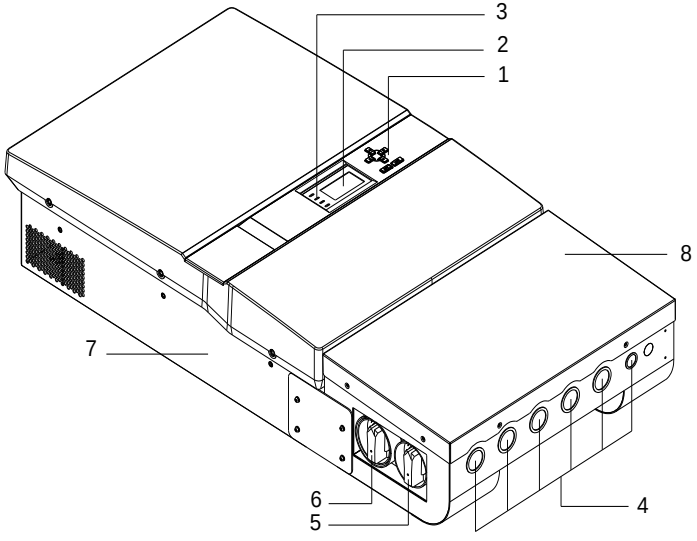


Figure 2-3 Appearance sketch of CPS SC20KTL-DO/US-480 & SC14KTL-DO/US-208

Description of main items of CPS SC20KTL-DO/US-480 & SC14KTL-DO/US-208 (See Figure 2-3):

1. LCD key buttons: operate the functions and change settings of inverter
2. LCD display: indicates data
3. LED indicator lights: indicate the status of inverter
4. Holes for cable entry
5. DC switch: control the DC power on and off
6. AC switch: control the AC power on and off
7. Main housing
8. Wiring box

Chapter 3 Installation

Below is the installation instruction of the inverter. Please read carefully and install the product step-by-step.

1. CPS SC20KTL-DO/US-480 & SC14KTL-DO/US-208

Check and make sure that the following items are included in the package before installation, as shown in Table 3-1.

Table 3-1 Main items

No.	Item	Q'ty	Note
(1)	CPS SC20KTL-DO/US-480 or SC14KTL-DO Grid-tied PV inverter	1	Grid-tied PV inverter
(2)	Mounting bracket	1	upon which Inverter is hung and mounted onto a wall
(3)	Installation and operation manual	1	Installation and operation manual
(4)	Accessory kit	1	contains all necessary accessories

The (5) Accessory kit contains items listed below:

Table 3-2 Accessories

Item	Q'ty	Purpose
M8x25 Expansion bolts&nuts	8 pairs	for bracket installation
OT type terminal	1	for ground cable

Pre-insulated end ferrule	20	16 for DC input cables, 4 for AC output cables
RJ45 connecters	4	for communication cables
Flange M5 nut	2	for grounding wire (1 nut for backup use)
Red wire	1	for inverter with 1 MPPT working alone
Black wire	1	for inverter with 1 MPPT working alone

3.1 Basic requirements

- ✓ Check that the product environmental specifications (protection degree, operating temperature range, humidity and altitude, etc) meet the requirements of the specific project location;
- ✓ Make sure that the power grid voltage is within normal range;
- ✓ Ensure that the local electricity supply authority has granted permission to connect to the grid;
- ✓ Ensure that local code requirement is met by enabling the AFCI function from the LCD screen. This feature is disabled by default but can be enabled in the field.
- ✓ Installation personnel must be qualified electricians or people who have received professional training;
- ✓ Sufficient space is provided to allow the inverter cooling system to operate normally;
- ✓ Install the inverter away from flammable and explosive substances;
- ✓ Avoid installing the inverter in locations that exceed the temperature

limits specified in the inverter data sheet to limit undesirable power loss;

✓ Do not install the inverter near the electromagnetic source which can compromise the normal operation of electronic equipment;

3.2 Mechanical installation

(1) Dimensions

The dimensions of CPS SC20KTL-DO/US-480 & SC14KTL-DO inverter are shown in Figure 3-1.

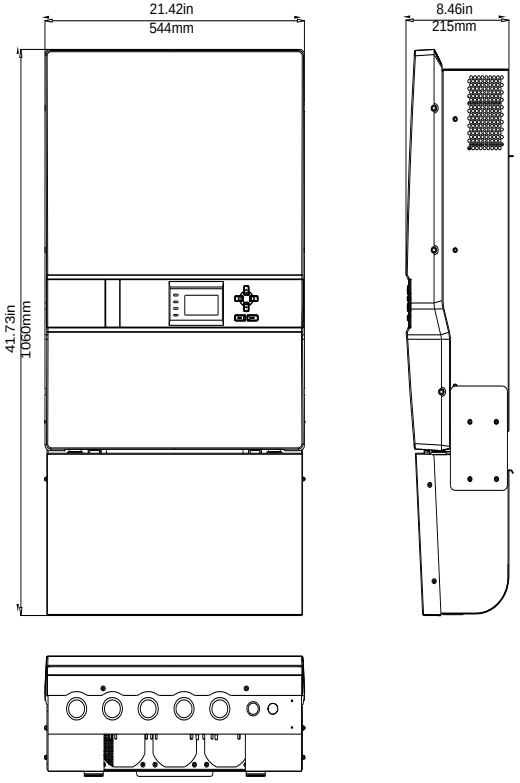


Figure 3-1 Dimensions of CPS SC20KTL-DO/US-480 & SC14KTL-DO/US-208

(2) Installation method

Make sure that the mounting structure (wall, rack, etc) is suitable to support the inverter weight. Follow the mounting guidelines below:

(a) If the location permits, install the inverter vertically.

(b) If the inverter cannot be mounted vertically, it is allowed to be tilted backward by Max. 15°.

(c) Do NOT mount the inverter forwards.

(d) Do NOT mount the inverter in a horizontal position.

(e) Do NOT mount the inverter upside down.

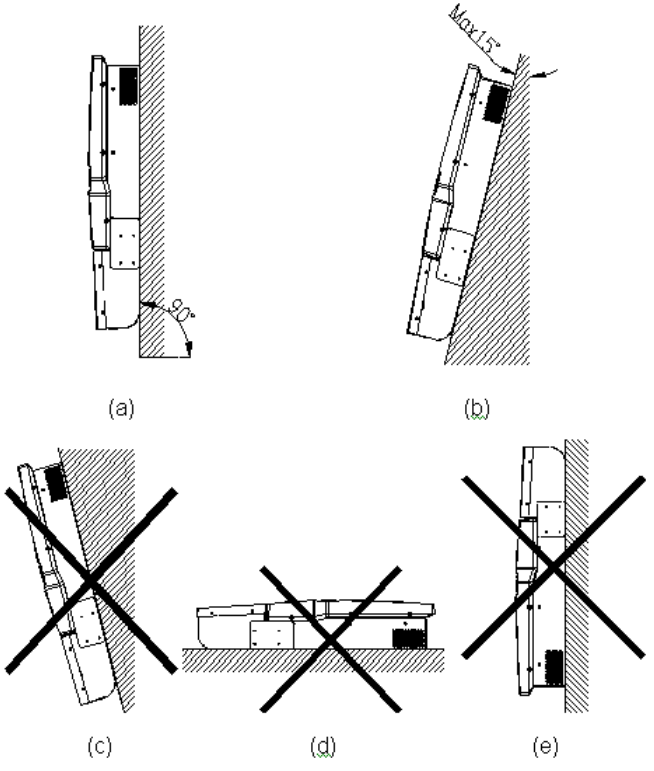


Figure 3-2 Mounting the inverter properly

NOTICE:

When the inverter is mounted backward by ⩽15° outdoor, shield cover is required to be installed above the inverter to avoid direct sunlight.

(3) Space required for inverter mounting on the wall (as shown in Figure 3-3)

The distances between the inverter and the surrounding objects should meet the following conditions: two sides from the walls ≥11.81 inches; top distance ≥11.81 inches; bottom distance ≥23.62 inches; the minimum spacing between two adjacently mounted inverters ≥23.62 inches.

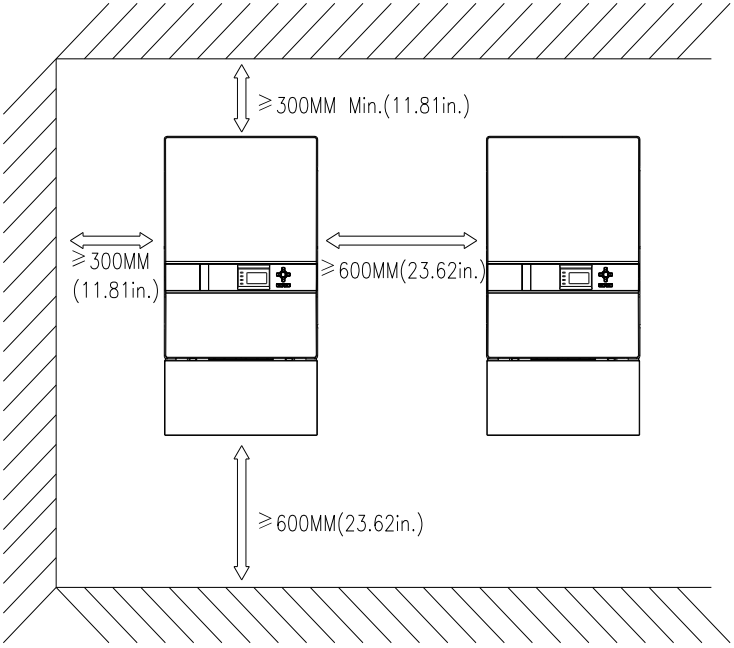


Figure 3-3 Inverter mounting dimensions

(3) Secure the bracket with bolts through the mounting holes and install the inverter:

(a) Mark the 6 bolt holes for mounting the bracket as shown in Figure 3-4;

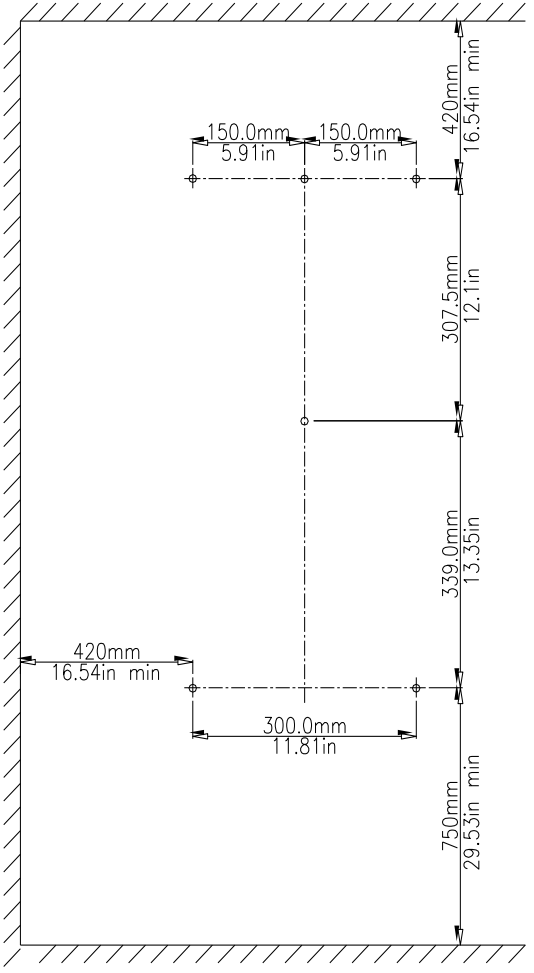


Figure 3-4 Bracket mounting dimensions

(b) Drill holes at the marked positions with a diameter of 0.4 inch drill

and put the 6 M8*25 expansion bolts into the holes;

(c) Take the mounting bracket out of the package and secure the bracket on the wall with the 6 nuts in pair as shown in Figure 3-5;

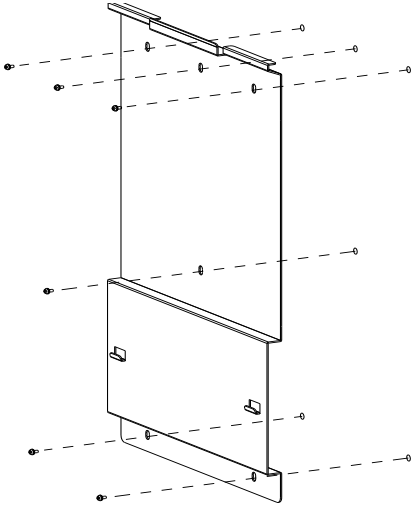


Figure 3-5 Positions of bolt holes on the bracket

(d) Screw off the bolts and remove the two panels on both sides of the inverter as shown in Figure 3-6;

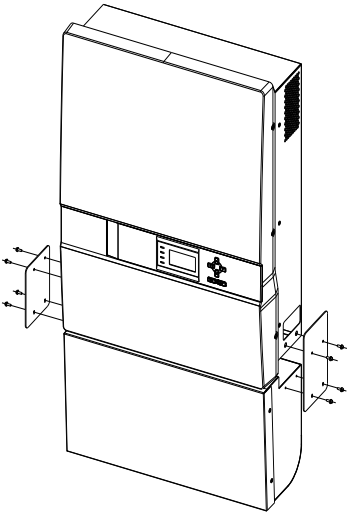


Figure 3-6 Removal of panels before mounting inverter

(e) Two people grab at the position on each side, lift up the inverter and then hang it on the bracket (Figure 3-7a~e). Make sure the inverter is securely hooked on the bracket;

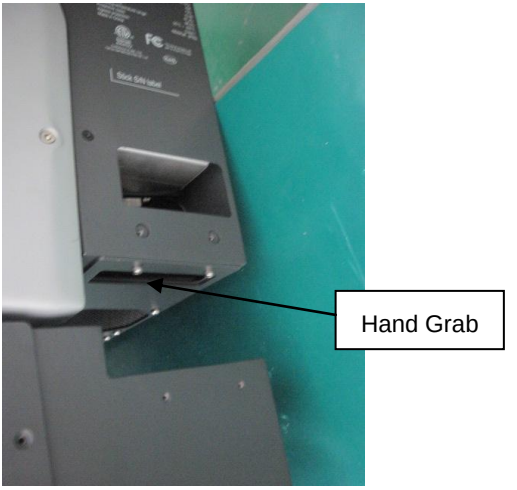


Figure 3-7a Mounting inverter on the bracket

Figure 3-7b Mounting inverter on the bracket

Figure 3-7c Mounting inverter on the bracket

Figure 3-7d Mounting inverter on the bracket

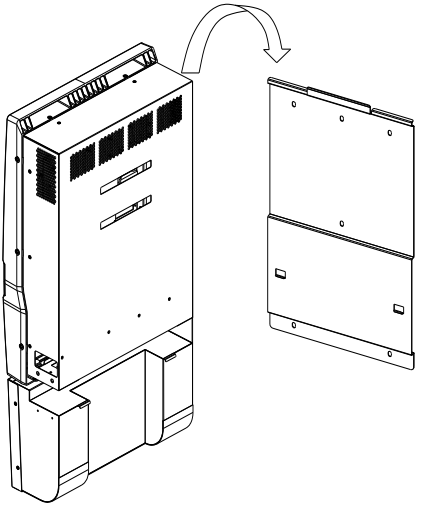


Figure 3-7e Mounting inverter on the bracket

(f) Put the two removed panels back and secure them with 4 M4*12

bolts on each side, as shown in Figure 3-8.

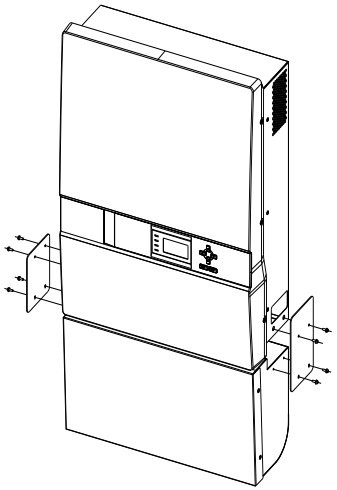


Figure 3-8 Securing panels on both sides

3.3 Electrical installation

INSTRUCTION:

Metal conduits shall be used as the cable protectors for wire connection.

Inverter cable terminals of CPS SC20KTL-DO/US-480 & SC14KTL-DO are shown in Figure 3-9:

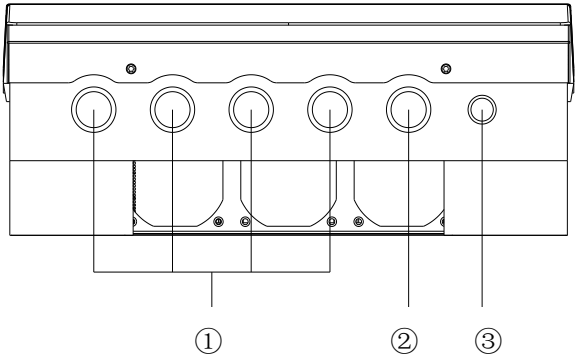


Figure 3-9 Inverter cable terminals

① Knockout holes for 1 & 1.25inch conduit of DC inputs

② knockout hole for 1 & 1.25inch conduit of AC output and ground cables

③ Knockout hole for 0.5 & 0.75inch conduit of communication cables

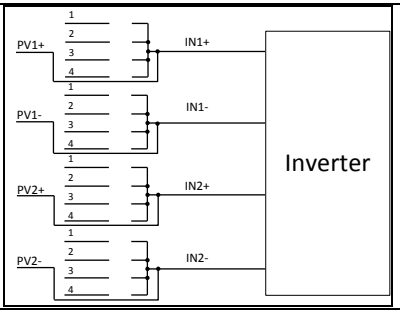
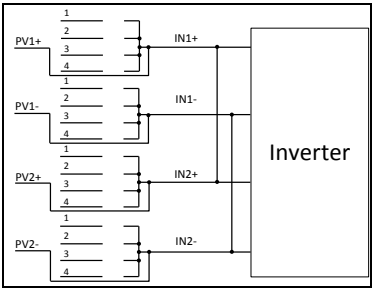
3.3.1 DC connection

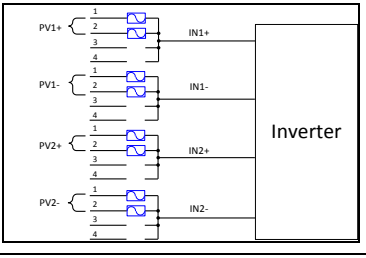
(1) To ensure the optimal performance of the inverter, please read the following guidelines before DC connection:

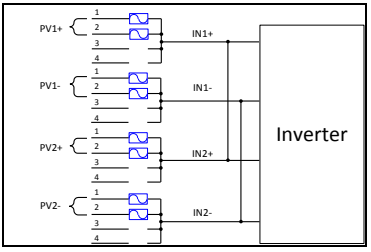
(a) First, make sure that the maximum open circuit voltage of the PV modules is lower than 600Vdc under any conditions;

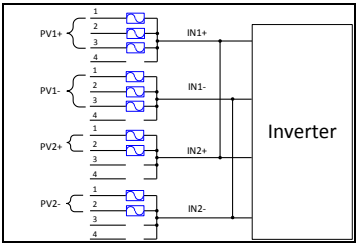
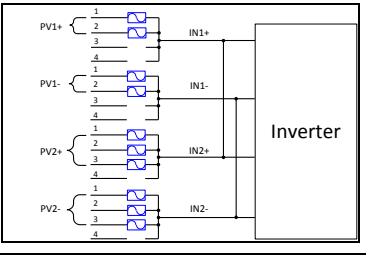
(b) Confirm that the PV modules for each MPPT of the inverter are of the same types and specifications before connection. The number, orientation, and tilt of PV modules may differ for different application.

(c) Configure the external wiring according to the following conditions:

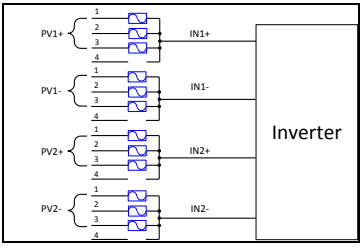
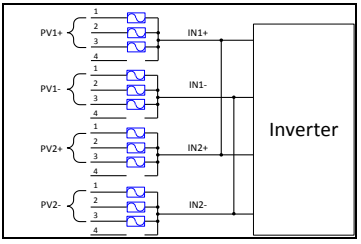
Rare Configuration	2 strings
2MPPT-Independent Mode Bypass Fuse	
1MPPT-Parallel Mode Bypass Fuse	
Current	26A
DC cable	10~6AWG
Fuse	NA

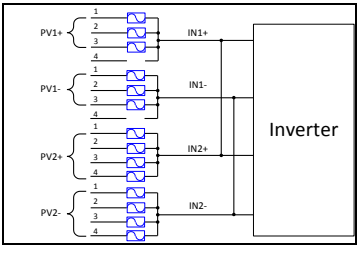
Common Configuration	4 strings
2MPPT-Independent Mode	

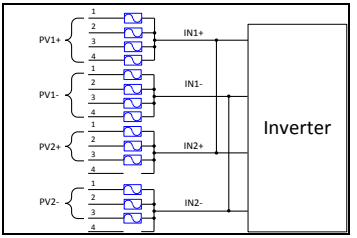
1MPPT-Parallel Mode	
Current	13A
DC cable	16~10AWG

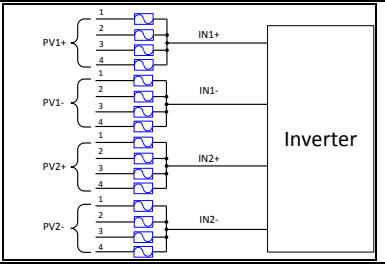
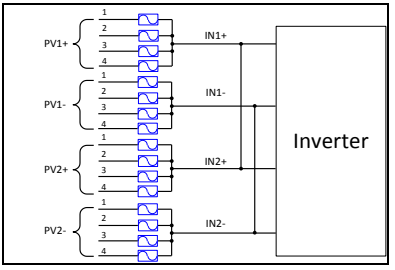
Common Configuration	5 strings
2MPPT-Independent Mode	
1MPPT-Parallel Mode	
Current	10.4A
DC cable	16~10AWG

Common Configuration	6 strings

2MPPT-Independent Mode	
1MPPT-Parallel Mode	
Current	8.7A
DC cable	18~10AWG

Common Configuration	7 strings
2MPPT-Independent Mode	

1MPPT-Parallel Mode	
Current	7.4A
DC cable	18~10AWG

Common Configuration	8 strings
2MPPT-Independent Mode	
1MPPT-Parallel Mode	
Current	6.5A
DC cable	18~10AWG

Note 1: The temperature rating of the input wirings should be no less than 90℃(194℉).

Note 2: The recommended fuse types are configured according to the condition that the input strings are the same.

(d) CPS SC20KTL-DO/US-480 & SC14KTL-DO inverter is equipped with standard 15A DC fuses. Customers must verify that the appropriate fuses are used depending on the actual configuration of PV strings.

1） Each independent string of DC input from the PV strings needs fuse protection.

2） The rated voltage of fuse should be higher than the Max. Voc of each PV string.

3） In order to keep the output power normal, the rated current of fuse is generally larger than the 1.56 × Max. output current from the PV strings.

4） In order to protect the PV strings, the rated current of fuse should NOT be larger than the sum of the Isc of any two of the PV strings. Make sure the rated current of fuse is as small as possible on the condition of normal output power.

5） The following table lists the fuse type, specifications and number under the rated voltage and power range of 8 strings of PV panels.

Table 3-4 DC Fuse selection

14 kW	Brand	4 Strings	5 strings	6 strings	7 strings	8 strings
	Littelfuse	KLKD 25	KLKD 20	KLKD 15	KLKD 12	KLKD 12
		25A/600V	20A/600V	15A/600V	12A/600V	12A/600V
20 kW	Brand	4 Strings	5 strings	6 strings	7 strings	8 strings
	Littelfuse	KLKD 30	KLKD 25	KLKD 20	KLKD 20	KLKD 15
		30A/600V	25A/600V	20A/600V	20A/600V	15A/600V

Note 1: The input string size must be the same.

Note 2: The DC fuse protectors of different fusing capacity should be chosen according to the short circuit current of PV modules. The 600VDC

Littelfuse KLKD fuse series are recommended. The detailed information is available for customers to find and download from http://www.littelfuse.com/.

(b) Insert the cables through steel conduits and strip the skin 0.4 inch off the cables as shown in Figure 3-10:

Figure 3-10 Wire stripping of DC input

(c) Crimp the terminal as shown in Figure 3-11:

Figure 3-11 Terminal crimping of DC input

(d) The order of wire connection from left to right is PV1+, PV1-, PV2+, PV2-. Connect the PV1- and PV2- to the corresponding fuse socket of the negative pole and connect the PV1+ and PV2+ to the corresponding fuse socket of the positive pole with the torque value of **1.2N-M (10.6Lb-In.)**.

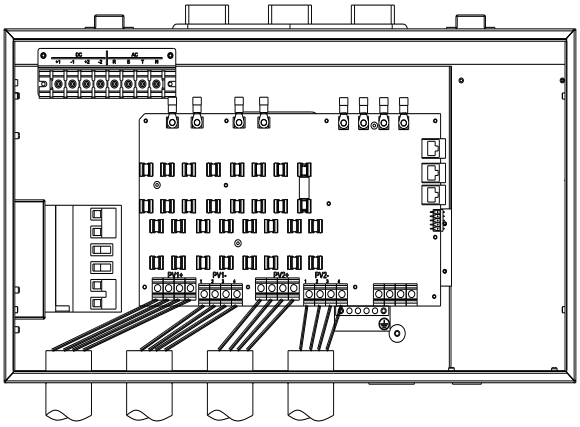


Figure 3-12 Wire connection of DC input

(e) The standard configuration is “Parallel mode” with 1MPPT working alone. If it needs to switch to the “Independent mode” with 2MPPTs working independently, please remove the red wire and black wire in the wiring box. (As shown in Figure 3.13)

For the inverter with 2 MPPT working independently, disconnect J1 (IN1+) with J3 (IN2+) wire socket (in the Wiring box) through the red; disconnect J2 (IN1-) with J4 (IN2-) wire socket through the black wire in the wiring box, as shown in Figure 3-13:

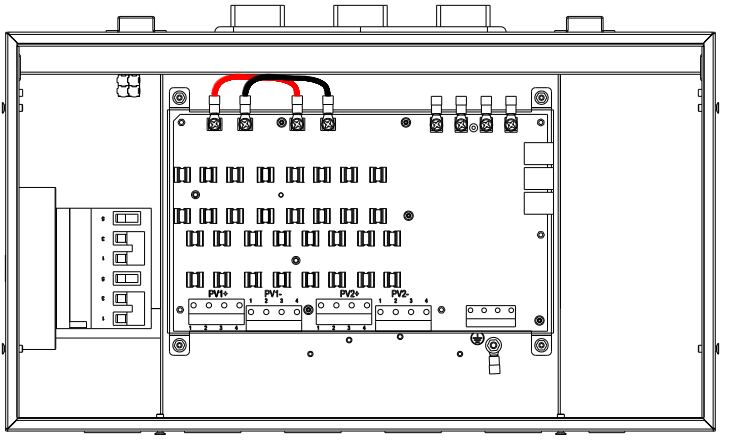


Figure 3-13 Wire connection in the Wiring box (1 MPPT working alone)

3.3.2 AC and ground connection

The following describes how to connect the AC output and grounding cables between the inverter and the public power grid:

(1) Use the recommended cables:

L1 (Line 1), L2 (Line 2), L3 (Line 3), Neutral and Gnd (Equipment grounding conductor)：8~10AWG copper cored soft cables

Table 3-8 Wiring requirement

	L1	L2	L3	Neutral	Gnd
Wire diameter	8~10AWG				
Bolts	M4 screw				M5 nut
Torque value	1.19N-M (10.5Lb-In.)				

(2) Wire connection for AC output:

(a) Insert the cables through steel conduits and strip the skin 0.4 inch off the cables as shown in Figure 3-14:

Figure 3-14 Diagram for wire stripping of AC output

(c) Crimp the terminal as shown in Figure 3-15:

Figure 3-15 Diagram for terminal crimping of AC output

(d) Connect the L1, L2, L3 and Neutral (red, black, blue, grey) AC output wires to the corresponding terminals on the PCB board.

(3) Wire connection for grounding:

(a) The Gnd wire (Equipment grounding conductor) is recommended to be green or green with continuous yellow stripes, per National Electrical Code. Insert the cable through the steel conduit and strip the skin 0.4 inch off the cables as shown in Figure 3-16:

Figure 3-16 Diagram for wire stripping of grounding conductor

(b) Crimp the terminal with the ring terminal in the accessory kit as shown in Figure 3-17:

Figure 3-17 Diagram for terminal crimping of grounding conductor

(c) Connect the Gnd cable with a M5 nut at the marked place on the lower right side of the Wiring box, as shown in Figure 3-18(a). The Gnd cable can also be connected to the copper stick as shown in Figure 3-18(b).

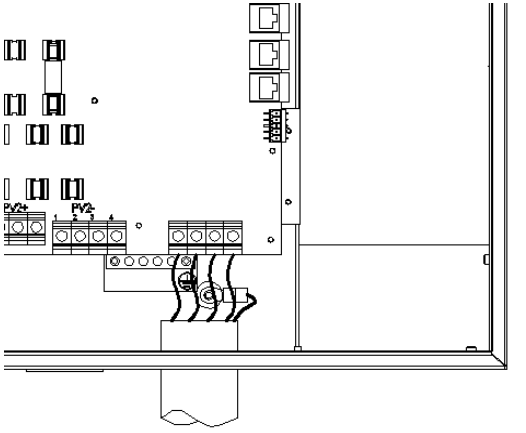


Figure 3-18(a) Diagram of AC output and ground cable connection

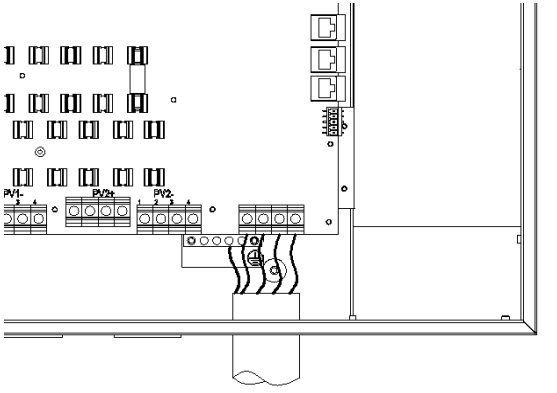


Figure 3-18(b) Diagram of AC output and ground cable connection

(4) When the output of the inverter is connected to the grid, an AC circuit breaker is required to be installed to safely disconnect the inverter from the grid when overcurrent happens.

Either a 3 pole or a 4 pole AC circuit breaker can be used. The maximum breaker size allowed is 50A and 40A respectively for 14kW and 20kW inverter. A smaller breaker may also be used, keeping in mind that a smaller breaker may result in nuisance trips that may need servicing.

Table 3-8 Specification of AC breaker selection

Inverter	AC breaker rated current (A)
CPS SCA14KTL-DO/US-208	50
CPS SC20KTL-DO/US-480	40

3.3.3 Communication connection

There are two RS485 signal ports on the inverter. Shielded cables should be used for communication cables with the maximum length of 3280 feet.

(1) The communication of one single local inverter is to connect the RS485 communication bus cable through the RS485-1 or RS485-2 port of the inverter directly. Wiring requirement of RS485-1/2 is shown in Table 3-9:

Table 3-9 RS485-1/2 wiring requirement

No.	Color	Function
1	White orange	485+
2	Orange	N.C.
3	White green	485-
4	Blue	N.C.
5	White blue	N.C.
6	Green	N.C.

7	White brown	COM
8	Brown	N.C.

(2) The wires are labeled 1~8 from left to right, as shown in Figure 3-19:

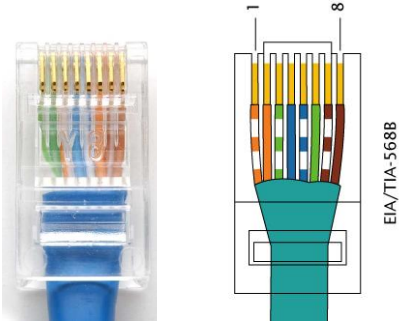


Figure 3-19 Diagram of RS485-1/2 wiring

(3) RS485 network connection:

When the inverters are monitored via the RS485 communication, the unique RS485 address for each inverter can be set through the LCD interface. Up to 31 inverters can be connected together in the RS485 communication network. The Daisy-chain topology is recommended for the RS485 network connection, as shown in Figure 3-20. Other communication topologies, such as the star networks, are not recommended.

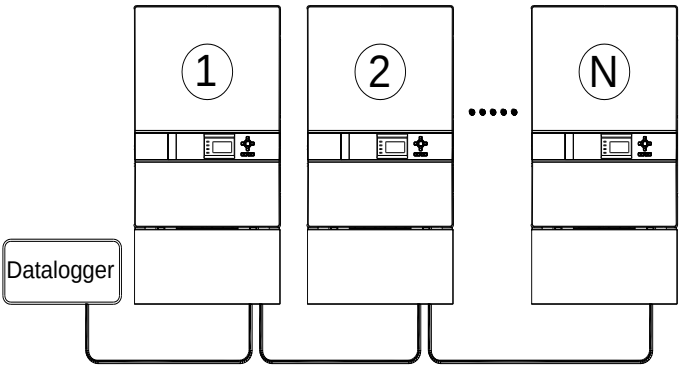


Figure 3-20 RS485 connection between inverters and datalogger

(4) A terminal resistance of 120 ohms connected between Pin 1 and Pin 3 of RS485-1/2 of the first inverter in the multiple inverters string and data logger as shown in Figure 3-20 is recommended.

(5) The connection inside the Wiring box of the inverter after the first one is shown in Figure 3-21:

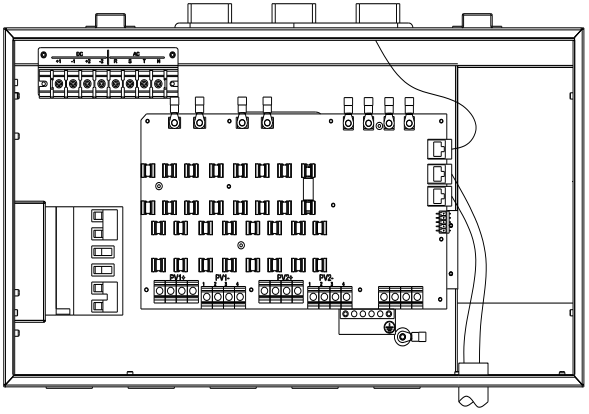


Figure 3-21 Diagram of communication wiring

Chapter 4 Operation

4.1 Start-up and shut-down

4.1.1 Start-up

Manual start-up: Manual start-up is required after initial installation or manual (fault) shut-down. Move the cursor from the main operation interface to “4 Setting”. Press ENTER and go to the password input area, enter password“↑"→"↓"←”, go to the submenu “1 ON/OFF”. Then move the cursor to “ON” and press ENTER to start the inverter. Then the inverter will start up and operate normally if the start-up condition is met. Otherwise, the inverter stands by.

Automatic start-up: The inverter will start up automatically when the output voltage and power of PV modules meet the set point, AC power grid is normal, and the ambient temperature is within allowable operating range.

4.1.2 Shut-down

Manual shutdown : Normally, manual shutdown is not required. It can be shut down manually if repair or maintenance is required. Move the cursor from the main operation interface to “4 Setting”. Press ENTER and go to the password input area, enter password“↑"→"↓"←”, go to submenu “1 ON/OFF”.. Move the cursor to “OFF” and press ENTER, and then the inverter will be shut down.

Automatic shutdown: The inverter will shut down automatically when the output voltage and power of PV modules are lower than the set point, or AC power grid fails; or the ambient temperature exceeds the normal range.

4.2 Operation mode

There are 4 operation modes. The following are corresponding indications

for each mode.

(1) System check mode for start up, as shown in Figure 4-1:

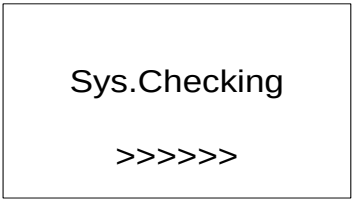
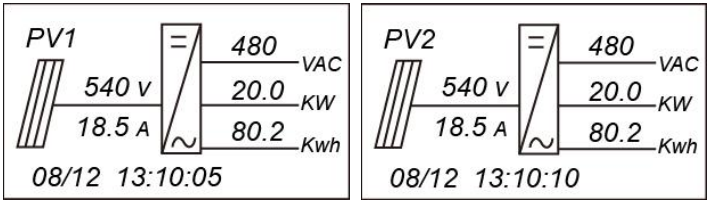


Figure 4-1 System self check ongoing

This mode indicates that the inverter is checking whether it is ready for normal operation after the manual start-up of the inverter.

(2) Normal operation mode: Default indication interface for normal operation of CPS SC20KTL-DO/US-480 & SC14KTL-DO is shown in Figure 4-2 (a) and 4-2 (b). The switching time between (a) and (b) is 5 seconds.



(a) (b)

Figure 4-2 Default indication interface for normal operation

In this mode, the inverter converts the power generated by PV modules to AC continuously and feeds into the power grid.

(3) Standby mode, as shown in Figure 4-3:

The inverter will turn into standby mode when the output voltage and power of PV modules do not meet the startup conditions or PV voltage and input power are lower than the set point. The inverter will check automatically whether it meets the startup conditions in this mode until it turns back to normal mode. The inverter will switch from standby mode to fault mode if malfunction occurs.

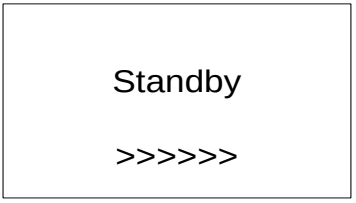


Figure 4-3 Inverter system in standby mode

(4) Fault mode, as shown in Figure 4-4:

The inverter will disconnect from the power grid and turn into fault mode when the inverter or power grid fails. Check the specific cause through “Troubleshooting table” (Table 4-1) in terms of the fault message displayed on the LCD and eliminate the fault according to the instructions.

Figure 4-4 Fault indication interface

WARNING:

All the installation and wiring connections should be performed only by qualified technical personnel. Disconnect the inverter from PV modules and the Power Grid before maintaining and operating the equipment.

4.3 Grid connection and power generation

The grid connection and power generation process of CPS SC20KTL-DO/US-480 & SC14KTL-DO is automatic. It will check constantly whether AC power grid meets the grid connection and power generation

conditions. At the same time, it will also check whether the DC input of PV modules is sufficient. The inverter will turn into normal operation mode when both of AC and DC conditions are fulfilled. The inverter will disconnect from the power grid and switch to standby mode when the sunlight is weak and power generation is small. The inverter will try to reconnect to the power grid and generate power again when the voltage of PV modules is stable and higher than the set point.

4.4 Fault shutdown

The inverter will be shut down automatically when the PV power generation system fails, such as output short circuit, grid overvoltage / undervoltage, grid overfrequency / underfrequency, high ambient temperature or internal malfunction of the machine.

The causes of fault can be identified based on the faults listed in Table 4-1. Proper treatment is recommended before contacting after-sales service. There are mainly 3 types of faults: alarm, protection and hardware fault.

Table 4-1 Troubleshooting Table

Alarm	1. TempSensorErr	Definition: Prompt detection of abnormal temperature
		Possible causes: 1. Temperature Sensor socket connecter has poor contact; 2. Temperature Sensor is damaged;
		Recommended solutions: 1. Observe temperature display; 2. Switch off 3-phase working power supply and then reboot the system; 3. Contact after-sales service personnel
	2. SPICommErr	Definition: Communication inside inverter fails
		Possible causes: 1. Communication circuits inside inverter are loose; 2. LCD software problem; 3. Inverter software problem;
		Recommended solutions: 1. Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2. Turn off 3-phase working power supply and then reboot the system; 3. Contact our after-sales service center.

	3. IntFanErr	Definition: Fan (invisible from outside) inside inverter is working abnormally
		Possible causes: 1. Fan service life has expired; 2. Fan socket connecter has poor contact.
		Recommended solutions: 1. Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2. Switch off 3-phase work power supply and then reboot the system; 3. Contact after-sales service personnel
	4. ExtFanErr	Definition: The visible fan from outside view is working abnormally
		Possible causes: 1. Fan is blocked; 2. Fan service life has expired; 3. Fan socket connecter has poor contact.
		Recommended solutions: 1. Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2. Check for foreign matters on fan blades; 3. Switch off 3-phase work power supply and then reboot the system; 4. Contact after-sales service personnel
	5. EepromErr	Definition: Internal alarm

		Possible causes: Internal memory has a certain problem
		Recommended solutions: 1. Observe for 5 minutes and see whether the alarm will be eliminated automatically; 2. Contact after-sales service personnel
Protect	1. TempOver	Definition: Ambient temperature or temperature inside inverter is too high
		Possible causes: 1. Ambient temperature outside the inverter is too high; 2. Fan is blocked; 3. Cooling is affected because of incorrect installation.
		Recommended solutions: 1. Confirm that external ambient temperature is within the specified range of operating temperature; 2. Check whether radiation air inlet is blocked; 3. Whether radiation fan is blocked; 4. Check whether the location of installation is appropriate or not; 5. Observe for 30 minutes and see whether the alarm will be eliminated automatically; 6. Contact after-sales service personnel
	2. GridV.OutLim	Definition:

		Grid voltage exceeds the specified range,
		Possible causes: 1. Grid voltage is abnormal; Power grid breaks down 2. Cable connection between the inverter and the grid is poor;
		Recommended solutions: 1. Observe for 10 minutes and see whether the alarm will be eliminated automatically; 2. Check whether the grid voltage is within the specified range; 3. Check whether the cable between the inverter and power grid is disconnected or has abnormalities; 4. Contact after-sales service personnel
	3. GridF.OutLim	Definition: Grid voltage frequency is abnormal, or power grid is not detected
		Possible causes: 1. Grid frequency has abnormalities; 2. Cable connection between the inverter and the grid is poor;
		Recommended solutions: 1. Observe for 10 minutes and see whether the alarm will be eliminated automatically; 2. Check whether the grid frequency is within the specified range; 3. Check whether the cable between the

		inverter and power grid is disconnected or has abnormalities; 4. Contact after-sales service personnel
	4.PV1(2)VoltOver*	Definition: PV voltage exceeds the specified value
		Possible causes: PV over-voltage
		Recommended solutions: 1. Observe for 30 minutes and see whether the alarm will be eliminated automatically; 2. Check whether PV voltage exceeds the specified range; 3. Turn off the PV input switch, wait for 5 minutes, and then turn on the switch again; 4. Contact after-sales service personnel
	5.PV1(2) Reverse*	Definition: PV module is connected inversely
		Possible causes: PV positive pole and negative pole are connected inversely;
		Recommended solutions: 1. Check whether positive pole and negative pole are connected inversely; 2. Contact after-sales service personnel
	6. GFCI.Err	Definition: System leakage current is too high
		Possible causes: 1. Excessive parasitic capacitance on PV

		module due to environmental factor; 2. Grounding is abnormal; 3. Fault inside the inverter
		Recommended solutions: 1. Observe for 10 minutes and see whether the alarm will be eliminated automatically; 2.. Detect whether the electrical connection is abnormal 3. Contact after-sales service personnel
	7. IsolationErr	Definition: Insulation impedance of PV positive to ground or PV negative to ground exceeds the specified range
		Possible causes: Air humidity is high
		Recommended solutions: 1. Observe for 10 minutes and see whether the alarm will be eliminated automatically; 2. Check insulation of PV system; 3. Contact after-sales service personnel
	8. IntProtectA~Z	Definition: Internal protection of the inverter
		Possible causes: Protection procedure occurs inside the inverter
		Recommended solutions: 1. Observe for 10 minutes and see whether the alarm will be eliminated automatically; 2. Contact after-sales service personnel

	9. ARC Protect	Definition: The electric arc occurs in the circuit.
		Possible causes: 1. The electric arc occurs on the DC side; 2. Fault with the ARC board
		Recommended solutions: 1. Check whether the circuit is in good condition, including the cable aging and animal gnawing; If no problem is found, restart the inverter to clear the ARC Protect alarm. 2. Contact after-sales service personnel
	10. ARC Board Error	Definition: Self-checking of the ARC board fails
		Possible causes: 1. Communication error in the connection between the ARC board and the inverter 2. Abnormal with the ARC board
		Recommended solutions: 1. Check whether the communication cable of the ARC board is normal. Turn off the power supply and restart the inverter to see whether the alarm will be eliminated automatically; 2. Contact after-sales service personnel Note: The “ARC Board Error” doesn’t interfere with the normal operation of the inverter.
Fault	IntFaultA~O	Definition: Internal fault of the inverter

		Possible causes: Fault occurs inside the inverter
		Recommended solutions: 1. The inverter can be forced to restart once if it is required by operation and if it is confirmed that there is no other problem; 2. Contact after-sales service personnel

INSTRUCTION:

*The actual display of “PV.VoltOver” is “PV1VoltOver” or “PV2VoltOver”.

*The actual display of “PV.Reverse” is “PV1Reverse” or “PV2Reverse”.

Chapter 5 User Interface

5.1 Description of LCD panel

The CPS SC20KTL-DO/US-480 & SC14KTL-DO LCD panel mainly consists of LCD screen, LED indicator lights, buzzer and 6 keys, as shown in Figure 5-1.

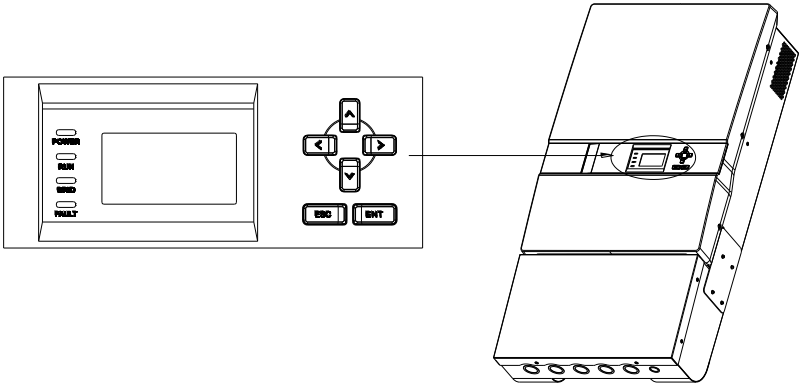


Figure 5-1 LCD panel

Interpretation for the indicator lights is shown in Table 5-1 and function of the keys is shown in Table 5-2.

Table 5-1 LED Indication

LED light	Name	Status	Indication
POWER	Working power light	Light on	Energized (control panel starts to work)
		Light off	Power supply not working
RUN	Grid-tied operation	Light on	In grid-tied power generation state

	indication light	Flash	Derated running status (light up 0.5s, light off 1.6s)
		Light off	In other operation status or power supply not working
GRID	Grid status indication light	Light on	Grid is normal
		Flash	Grid fault (light up 0.5s, light off 1.6s)
		Light off	Power supply not working
FAULT	Fault status indication light	Light on	Indicates a Fault
		Slow flash	Indicates Alarm (light up 0.5s, light off 2s)
		Fast flash	Protective action (light up 0.5s, light off 0.5s)
		Light off	No fault or power supply not working

Table 5-2 Definitions of the keys

Key	Description	Definition of function
	Escape key	Back/end/mute
	Enter key	Confirm entering the menu/confirm set point
	Up	Page up in selection menu

	Down	Page down in selection menu
	Left	-1 when setting parameters
	Right	+1 when setting parameters

5.2 Operation state

Table 5-1 indicates the definitions of LED, i.e. indicates the information of the inverter's operation state. It indicates that the system is energized and under DSP control when "POWER" lights up.

"RUN" will light up when the inverter detects that the grid connection conditions meet the requirements and power is fed into the grid. "RUN" will blink if the grid is in derated running state during the period of feeding power into the grid.

"GRID" will light up when the grid is normal during the operation of the inverter. Otherwise, "GRID" will blink until the grid restores to normal.

"FAULT" will blink quickly as a fault (except grid abnormality) occurs. "FAULT" will not light out until the fault is eliminated. The light will blink slowly when an alarm occurs. "FAULT" keeps being lighted up when an internal fault occurs.

The buzzer will give alarms if a fault (involving power grid abnormality) occurs.

5.3 Interface and menu functions

Users can perform the corresponding operations with the 6 function keys according to the indications of the LCD display.

5.3.1 Interface types

(1) The LCD interface starts with the company logo once the system is

energized, as shown in Figure 5-2.

Figure 5-2 LOGO interface

(2) Indication of inverter operation mode:

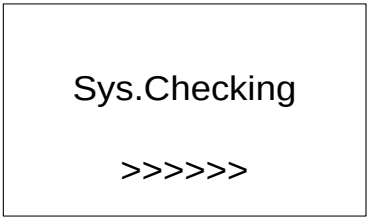


Figure 5-3 Inverter system check ongoing

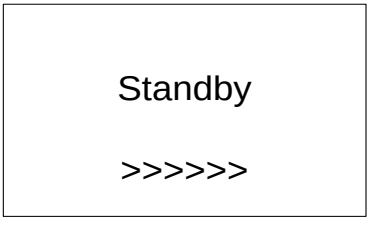
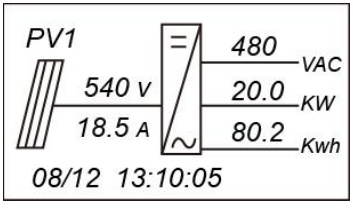
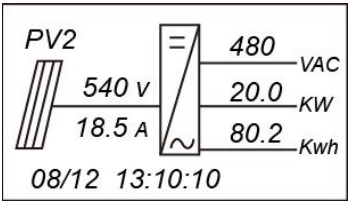


Figure 5-4 Inverter system in standby mode



(a)



(b)

Figure 5-5 Default display interface for normal operation

Figure 5-6 Fault indication interface

LCD screen will display different mode interfaces based on the operation modes of the inverter. There are four operation modes: startup system check mode (as shown in Figure 5-3), stand-by mode (as shown in Figure 5-4), normal operation mode (as shown in Figure 5-5, the switching time between (a) and (b) is 5 seconds), and fault mode (as shown in Figure 5-6).

The default indication interface mainly indicates PV voltage, PV current, grid voltage, instant power, daily generated power and time information under normal operation.

The fault information of the most recent / current fault will be indicated on the LCD screen when the inverter is in fault mode.

5.3.2 Main operation interface

LCD screen displays “default indication interface” when the inverter is in operation mode. Press ESC in this interface to escape the default interface and enter the main operation interface. The main operation interface is shown in Figure 5-7.

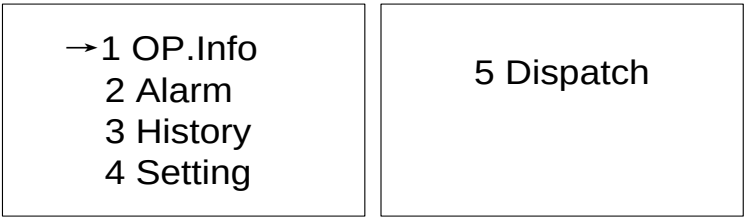


Figure 5-7 Contents indicated on the main operation interface

The main operation interface of LCD screen has 5 menus, i.e. “1 OP. Info”, “2 Alarm”, “3 History”, “4 Setting” and ”5 Dispatch”. The users may select options with PAGEUP and PAGEDOWN, and then press ENTER to confirm selection. Return to the previous menu by pressing ESC.

5.3.3 Operation information

When the cursor moves to “1 OP. Info” in the main interface, you should press ENTER to select the operation information as shown in Figure 5-8. Check the information by pressing PAGEUP and PAGEDOWN. Return to the previous menu and enter the main operation interface by pressing ESC.

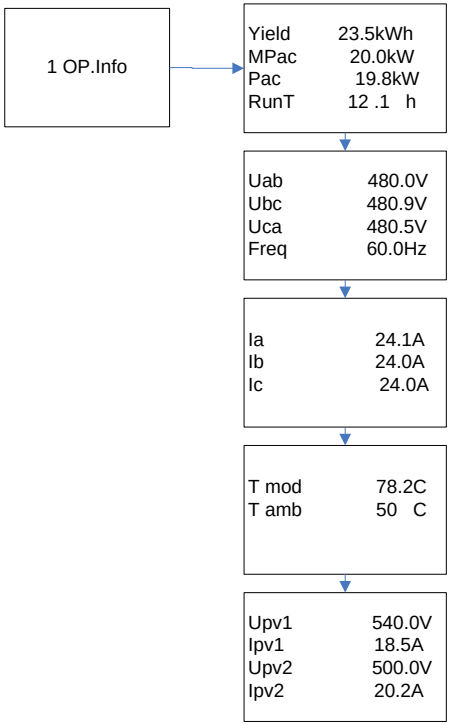


Figure 5-8 Operation information indication

5.3.4 Alarm

As described before, when faults occur during the normal operation of the inverter, corresponding fault message will be indicated in “2 Alarm” menu besides the sound and light alarms. Move the cursor to “2 Alarm” and press ENTER to check out the specific fault information, as shown in Figure 5-9.

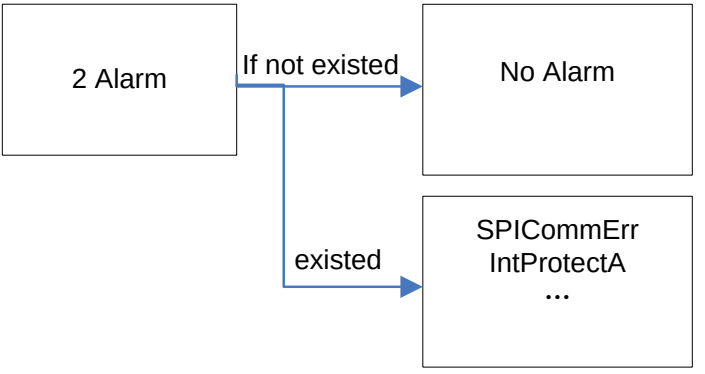


Figure 5-9 Alarm / failure information

5.3.5 History

Move the cursor to “3 History” in the main interface. Press ENTER to check the history information, as shown in Figure 5-10. There are 4 submenus in “3 History” : “1 ErrRecd”, “2 OP. Recd”, “3 Version” and “4 TotalTag”.

(1) UP to 100 pieces of latest fault messages can be recorded and found in “1 ErrRecd” menu.

(2) The latest 21 days’ operation history data is available to be found in “2 OP. Recd” menu. All variable names in the data comply with the content in “1 OP. Info” menu of the main interface. The users can select the “2 OP. Recd” menu and input the retraceable days (For example, the input number is 21. If the current date is December 15th, the LCD will indicate the operation information of 21 days before that date which is November 24th).

(3) Software version, hardware version and serial number of the product

are listed in “3 Version” menu.

(4) Cumulative generated power since the first day the inverter began working is available to be found in “4 TotalTag” menu.

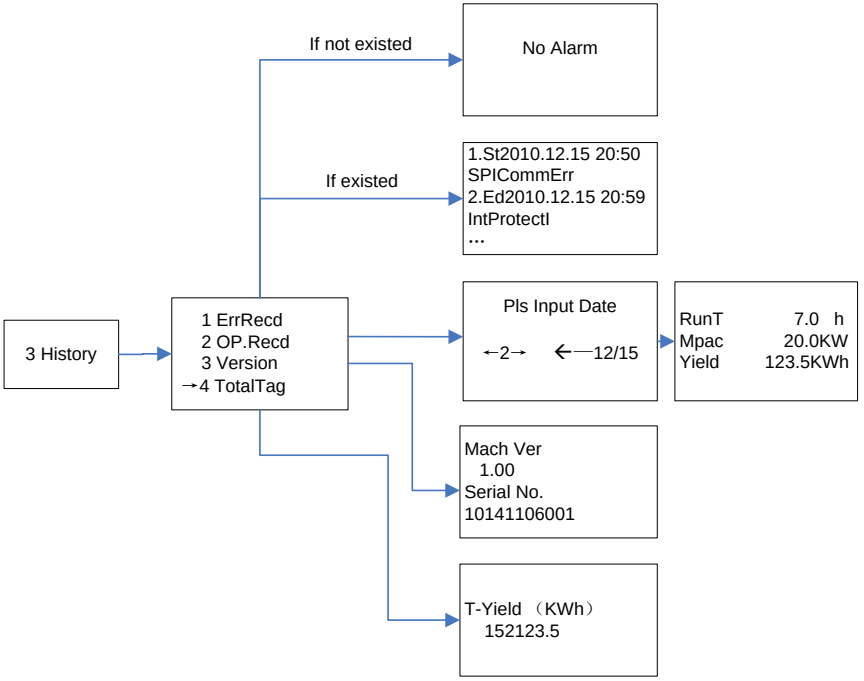


Figure 5-10 History menu and submenu

5.3.6 System setup

Move the cursor to “4 Setting” in the main interface. Press ENTER and go to the password input area, enter password“↑"→"↓"←”, go to the current system parameters, as shown in Figure 5-11. There are 6 submenus in “4 Setting” : “1 Power ON/OFF”, “2 Language”, “3 Sounds”, “4 SysTime” , “5 Commun.” and ”6 ARC Setup” .

(1) The inverter can be started and shut down with “1 ON/OFF” menu.

Move the cursor to “ON” and press ENTER, “ON State” will then be indicated at the bottom of LCD screen ; move the cursor to “OFF” and press ENTER, then “OFF State” will be indicated as well. The inverter will stand by instead of working normally if the startup conditions are not satisfied even “ON” is selected. The inverter will be shut down immediately if “OFF” is selected in any cases.

(2) Two languages, i.e. English and Chinese are available in “2 Language” menu.

(3) Key beep and Alarm beep can be set mute/unmute in “3 Sounds” menu. “Key beep” and “Alarm beep” can be chosen by pressing PAGEUP and PAGEDOWN. Shift between “Enable” and “Disable” by pressing Left and Right if the cursor is on the “Key beep”. Complete the setup by pressing ENT. Similarly, the Alarm beep can be set up as well.

(4) Set up the system date and time with “4 SysTime” menu (These parameters are of critical importance and will be used in history information). Select year, month, day, hour and minute by pressing Page Up/Page Down, and set up the specific date and time by pressing Left and Right.

(5) Set the 485 communication parameters with “5 Commun.” menu.

(6) Arcing check and protection is mainly divided into two parts, the Arcing check board is responsible for whether there is Arcing in line, and transfer Arcing protection signal to the DSP in the dominating control board. The control board DSP is responsible for the control of inverter off the grid after receiving Arcing signal to ensure safety. The Arcing board failure will cause ‘arc board err’ shown on the LCD and it will not connect to the grid until the arc board is OK. If there is Arcing fault, the LCD displays the fault which can only be cleared manually. The inverter ships in a default AFCI disabled mode

The “6 ARC Setup” has two submenus, i.e. “ ARC Option ” and ” ARC Clear ”:

1. “ ARC Option ” is used to control the ON/OFF of the ARC function. “Enable” means to turn on this function while “Disable” means to turn it off by pressing “←”and“→”to select. Press ENTER to confirm.

2. “ARC Clear” is used to clear the ARC fault protection. When the “ARC Protect” occurs, the system cannot clear the fault automatically. Users can go to the menu, move the cursor to the “ARC Clear”, and press ENTER to clear the “ARC protect”.

Note: The warning “Arc board Err” cannot be cleared by “ClearErr”. If the “Arc board Err” occurs, the fault system will continuously detect the status of Arc board and won’t clear the fault until the Arc board works normally.

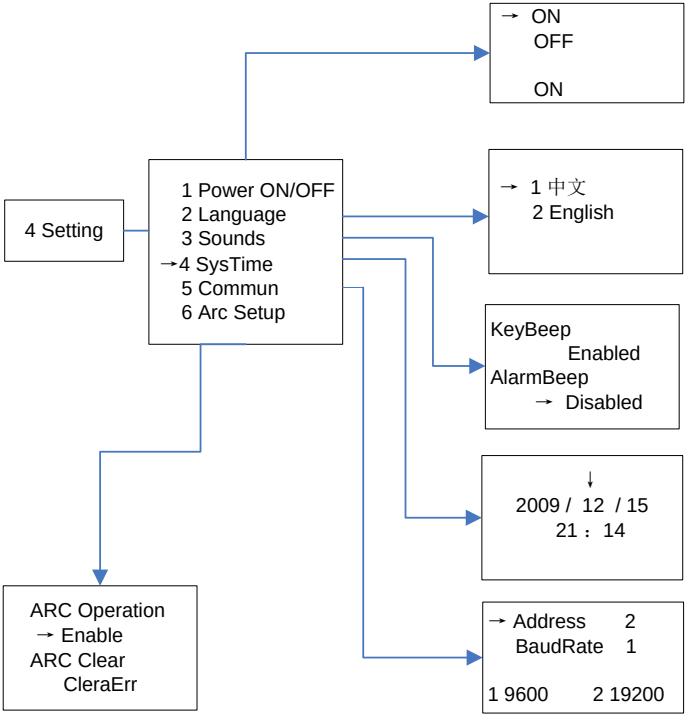


Figure 5-11 System setup menu and submenu

5.3.7 Power Dispatch

(1) For CPS SC20KTL-DO/US-480 the following applies –

"ActivePower" and "PowerFactor" parameters can be set up through LCD operations as well as remote control by software.

Local dispatch order: Service personnel can adjust the "ActivePower" and "PowerFactor" parameters through LCD operations. For detailed setup steps, please refer to "5.3.8 System protection parameters setup".

The current parameters of "ActivePower" and "PowerFactor" can be checked by the following steps.

Move the cursor to "5 Dispatch" in the main interface, as shown in Figure 5-12:

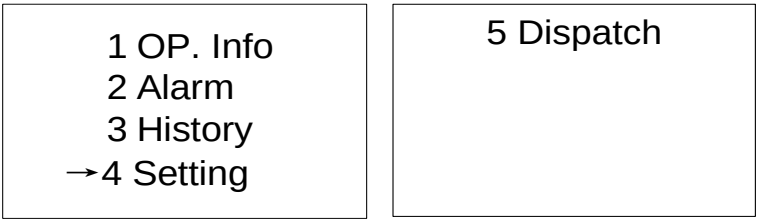


Figure 5-12 Contents indicated on the main operation interface

Press ENTER to the interface shown in Figure 5-13.

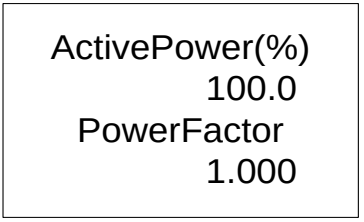


Figure 5-13 Parameters of power dispatch

Remote dispatch method: The "ActivePower" and "PowerFactor"

parameters can be adjusted through remote monitoring software.

(2) For CPS SC14KTL-DO/US-208 the following applies –

Move the cursor to “5 Power/PF” in the main interface. Press ENT to access and check the parameters of “ActivePower” and “PowerFactor”, as shown in Figure 5-14. The user can set the parameters of the two options through LCD operations as well as remote control by monitoring software.

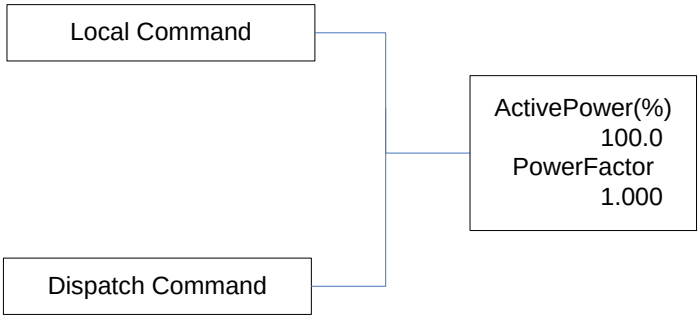


Figure 5-14 Options of Power/PF

Press ENT to access the “Power Control” menu, as follows:

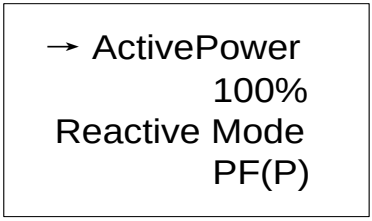


Figure 5-15 Power control menu

The active power parameters are adjustable from 0% to 100.0% in the “ActivePower (%)” menu.

You can select the specific reactive mode in the “ReactiveMode” menu.

The “ReactiveMode” menu has 6 submenus (Figure 5-16), including “1 None”, “2 Dispatch”, “3 Q Set”, “4 PF Set”, “5 PF(P) Set” and “6 Q(U) Set”.

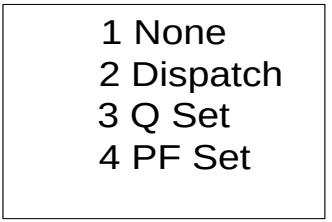


Figure 5-16 Submenus of ReactiveMode

1. None: No mode/Disable reactive mode
2. Dispatch: Remote power dispatch mode

Note: When the dispatch mode is selected, the reactive parameters of the inverter will change according to the remote change order, including ActivePower, PF and Q values.

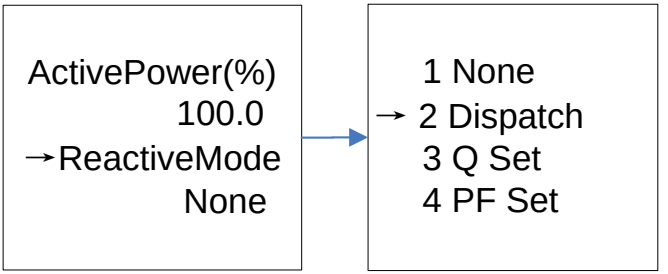


Figure 5-17 Enable the dispatch function

3. Q Set: Set the Q mode

Note: Change the reactive power by adjusting the Q value (reactive compensation)

4. PF Set: Set the PF mode

Note: Change the reactive power by adjusting the PowerFactor

5.3.8 System protection parameters setup

In standby mode, press PAGEDOWN and ENTER at the same time in the main interface and enter the password (PAGEUP -> PAGEDOWN -> RIGHT -> LEFT), the system parameter setup menu is accessed. This menu includes 4 submenus: “1 SysPara”, “2 Restart”, “3 Recover” and “4 ClrErrRecd”, as shown in Figure 5-18.

(1) Set up the system protection parameters in “1 SysPara” menu. The specification of protection parameters is shown in Table 5-3.

Table 5-3(a) Protection Parameters Table for CPS SC20KTL-DO/US-480

No.	Description of parameter	Setup range (lower limit, default & upper limit)
1	Grid line voltage upper limit	(200, 528, 533V)
2	Trip time under Max. Grid V.	(0.05, 1.80, 2.00S)
3	Grid line voltage lower limit	(0, 422, 480V)
4	Trip time under Min. Grid V.	(0.05，1.80，2.00S)
5	Grid frequency upper limit	(50.00，60.50，65.00Hz)
6	Grid frequency lower limit	(45.00，59.30，60.00Hz)
7	Trip time under Min. Grid F.	(0.05，0.16，300.00S)
8	Insulation impedance lower limit	(200，600，1200KΩ)
9*	Active power derating	(80.0%，100.0%，100.0%)
10*	Reactive power compensation	(-0.900，1.000，0.900)

Table 5-3(b) Protection Parameters Table for CPS SC14KTL-DO/US-208

No.	LCD indication	Description	Setup range (lower limit, default & upper limit)
1.	V.MaxI (V)	Class I Max. grid voltage	{224.0, 228.8, 249.0}
2.	VmaxTripTI (S)	Class I Max. trip time	{0.08, 1.00, 600.00}
3.	V.MinI (V)	Class I Min. grid voltage	{104.0, 183, 187.0}
4.	VminTripTI (S)	Class I Min. grid voltage trip time	{0.08， 2.00, 600.00}
5.	V.MaxII (V)	Class II Max. grid voltage	{0, 249.6, 485.0}
6.	VmaxTripII (S)	Class II Max. grid voltage trip time	{0.08, 0.16, 600.00}
7.	V.MinII (V)	Class II Min. grid voltage	{100.0, 104, 183.0}
8.	VminTripTII (S)	Class II Min. grid voltage trip time	{0.08, 0.16, 600.00}
9.	F.MaxI (Hz)	Class I Max. grid frequency	{60.00, 60.5, 63.00}
10.	FmaxTripTI (S)	Class I Max. grid frequency trip time	{0.08, 0.16, 600.00}
11.	F.MinI (Hz)	Class I Min. grid frequency	{57.00, 59.3, 60.00}
12.	FminTripTI (S)	Class I Min. grid frequency trip time	{0.08, 0.16, 600.00}
13.	V.MaxRecover	Max. grid voltage recover value	{208.0, 225, 249.0}
14.	V.MinRecover	Min. grid voltage recover value	{104.0, 186, 208.0}

15.	V.RecoverT (S)	Grid voltage recover time	{0.08, 300, 600.00}
16.	F.MaxRecover	Max. grid frequency recover value	{50.00, 60.4, 62.00}
17.	F.MinRecover	Min. grid frequency recover value	{58.00, 59.4, 60.00}
18.	F.RecoverT	Grid frequency recover time	{0.08, 300, 600.00}
19.	PVStartVol (V)	PV startup voltage	{150.0, 295, 310.0}
20.	SoftStep (KW/S)	Soft step	{0.1, 0.1, 1}

INSTRUCTION:

The function of **active power derating** and **reactive power compensation** is optional. For detailed information, you may call our after-sales service center.

(2) “2 Restart” menu. If an internal fault shutdown happens, a severe fault has occurred inside the inverter. The user may perform a force restart once in this menu if the user needs to restart the inverter.

INSTRUCTION:

The “Restart” function is effective only when the fault “IntFaultA~O” in the troubleshooting table occurs. The inverter may restore to normal operation automatically if alarm or protection faults occur. This function will not respond when the inverter is in operation mode and a “FaultOperated” alarm interface will be indicated.

(3) “3 Recover” menu, the manufacturer’s parameter default value can be restored when the inverter is not in operation mode. Otherwise, a “FaultOperated” will be prompted.

(4) In “4 ClrErrRecd” menu, history information of the faults can be cleared. A confirmation is required to clear the records.

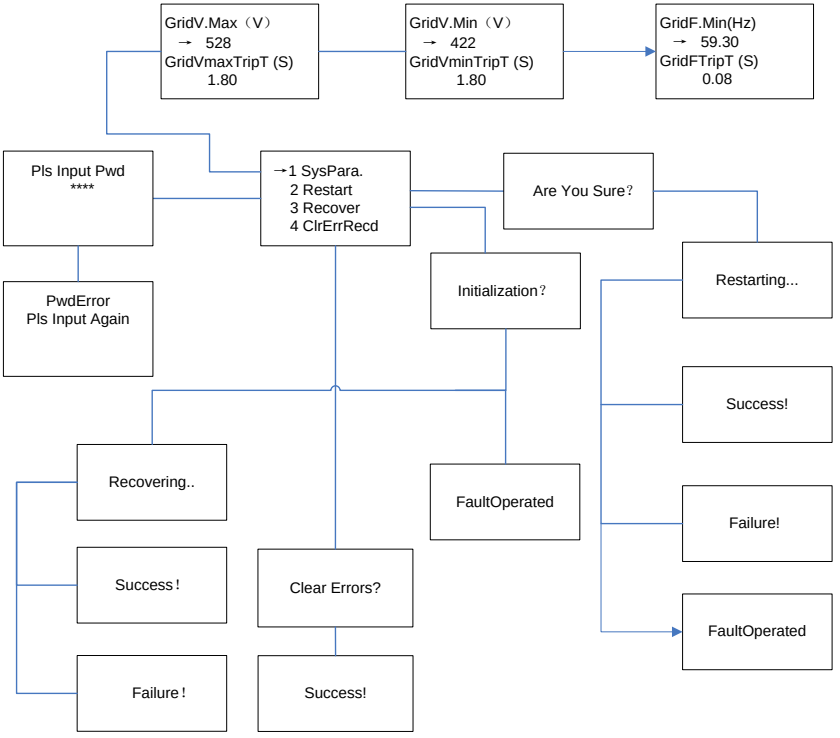


Figure 5-18 System parameter setup

Chapter 6 Service and Maintenance

CAUTION:

Although designed to meet international safety standards, the PV-Inverter can become hot during operation. Do not touch the heat sink or peripheral surfaces during or shortly after operation.

The CPS SC20KTL-DO/US-480 & SC14KTL-DO inverter is usually maintenance-free.

The following regular maintenance steps must nevertheless be carried out at regular intervals to ensure the inverter's operation with optimal performance.

6.1 Disassembling of fan tray assembly

(1) Screw off the bolts and remove the two panels on both sides of the inverter as shown in Figure 6-1; (Tool: PH2 cross screwdriver)

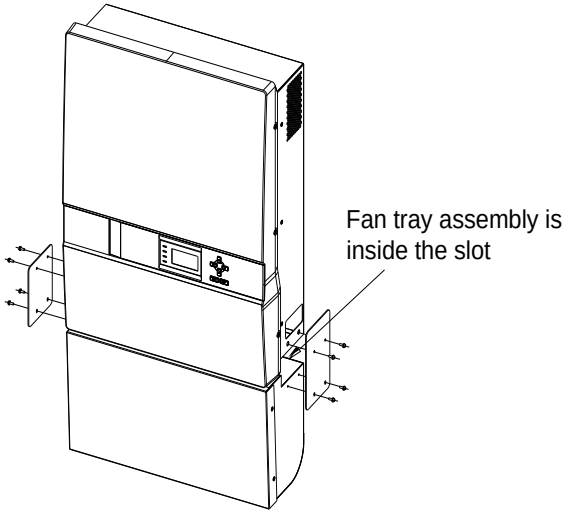


Figure 6-1 Removal of panels on both sides

(2) Disconnect the fan tray assembly from the inverter by unplugging the wire connectors as shown in Figure 6-2;

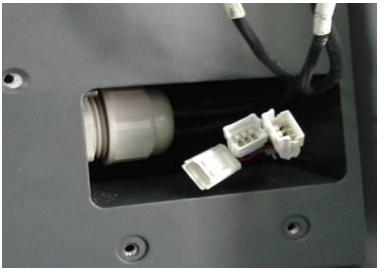


Figure 6-2 Unplugging the wire connectors

(3) Remove the 4PCS screws off the fan bracket as shown in Figure 6-3 and 6-4; (Tool: 0.12 inch Hexagon socket screw key)

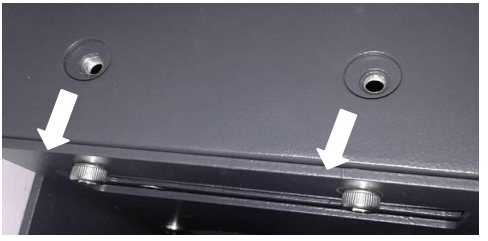


Figure 6-3 Unscrew the fan bracket on the left side

Figure 6-4 Unscrew the fan bracket on the right side

(4) Pull out the fan tray assembly from the left side of inverter as shown

in Figure 6-5;

Figure 6-5 Pulling out the fan tray assembly

(5) Use a dry cloth to clean the fan tray assembly to prevent dirt accumulating on it. Do not use abrasive cleaning agents to avoid the damage of fans.

6.2 Restoring of fan tray assembly

(1) Insert the fan tray assembly from the left side of the inverter as shown in Figure 6-6;

Figure 6-6 Inserting the fan tray assembly

(2) Hook the fan tray assembly inside the Main housing at the right end as shown in Figure 6-7;

Figure 6-7 Hooking the fan tray assembly

(3) Make sure the wire connectors reveal from the right hole and the bracket is well connected, as shown in Figure 6-8 and 6-9;

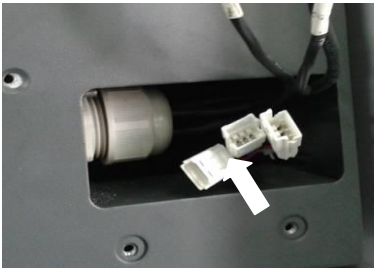


Figure 6-8 Revealing the wire connectors

Figure 6-9 Fan tray assembly well connected

(4) Connect the fan tray assembly with the inverter by plugging the wire connectors as shown in Figure 6-10;

Figure 6-10 Plugging the wire connectors

(5) Fix the left side of fan bracket on the Main housing with 2PCS screws as shown in Figure 6-11; (Tool: 0.12 inch Hexagon socket screw key)

Figure 6-11 Fixing the fan bracket on the left side

(6) Fix the right side of fan bracket on the Main housing with 2PCS screws as shown in Figure 6-12; (Tool: 0.12 inch Hexagon socket screw key)

Figure 6-12 Fixing the fan bracket on the right side

(7) Put the two removed panels back and secure the M4 screws on both sides with a torque value of 1.76N-M (15.6Lb-In.), as shown in Figure 6-13. (Tool: PH2 cross screwdriver)

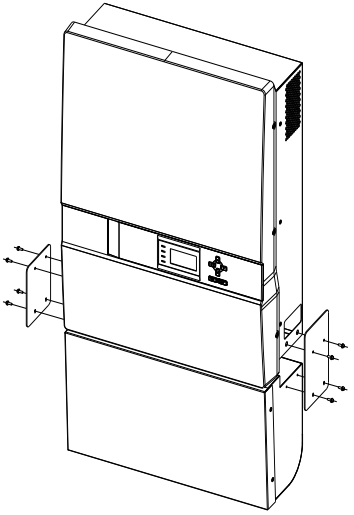


Figure 6-13 Securing panels on both sides

Chapter 7 Technical Data

Model Name	CPS SC14KTL-DO/US-208	CPS SC20KTL-DO/US-480
DC Input		
Max. PV Power	19kW (9.5kW/MPPT)	27kW (13.5kW/MPPT)
Nominal DC Input Power	14.6kW	21kW
Max. DC Input Voltage[1]	600Vdc	
Operating DC Input Voltage Range	180-580Vdc	260-580Vdc
Start-up DC Input Voltage / Power	300V / 100W	
Nominal DC Input Voltage	400Vdc	500Vdc
Number of MPP Trackers	2	
MPPT Voltage Range	300-540Vdc	300-550Vdc
Max. Input Current (Imp)	50A (25A per MPPT)	70A (35A per MPPT)
Max. Short Circuit Current (Isc)	90A (45A per MPPT)	91A (45.5A per MPPT)
Number of DC Inputs and Fuses	8 fused conductors (4 per MPPT)	
DC Disconnection Type	Switch	
AC Output		
Rated AC Output Power	14kW	20kW
Max. AC Output Power	14kW	20kW
Rated Output Voltage	208Vac	480Vac
Output Voltage Range	183-228Vac	422-528Vac

[1] Exceeding the rated voltage shown in “Max. DC Input Voltage” may cause permanent damage to the equipment

Grid Connection Type	3Φ / N / PE	3Φ / N / PE (Optional Neutral Connection)
Max AC Output Current	39A	24A
Rated Output Frequency	60Hz	
Output Frequency Range	59.3-60.5Hz	
Power Factor	>0.99 (Adjustable +/- 0.9)	
Current THD	<3%	
AC Disconnection Type	Switch	
System		
Topology	Transformerless	
Max. Efficiency	96.7%	97.4%
CEC Efficiency	96.0%	97.0%
Stand-by / Night Consumption	<20W / <2W	
Environment		
Protection Degree	NEMA 4 (IP65)	
Cooling	Variable speed cooling fans	
Operating Temperature Range	-13°F to +140°F / - 25°C to +60°C (derating from +50°C / +122°F)	
Storage Temperature Range	-22°F to +158°F/- 30°C to +70°C	
Operating Humidity	0-95%, non-condensing	
Operating Altitude	6562ft / 2000m (derating from 4921ft / 1500m)	
Display and Communication		
Display	LCD + LED	
Communication	RS485 (Modbus)	
Mechanical Data		
Dimensions (WxHxD)	21.4x41.6x8.5in / 544x1058x215mm	
Weight	141lbs / 64kg	

	Safety
Safety and EMC Standard	UL1741:2010, CSA-C22.2 NO.107.1-01, IEEE1547; FCC PART15
Grid Standard	IEEE1547: 2003, IEEE1547.1: 2005

Note[1]: The output power of CPS SC20KTL-DO/US-480 & CPS SC14KTL-DO/US-208 inverter de-rates when the DC voltage of is lower than 300V. (See Figure 6-1)

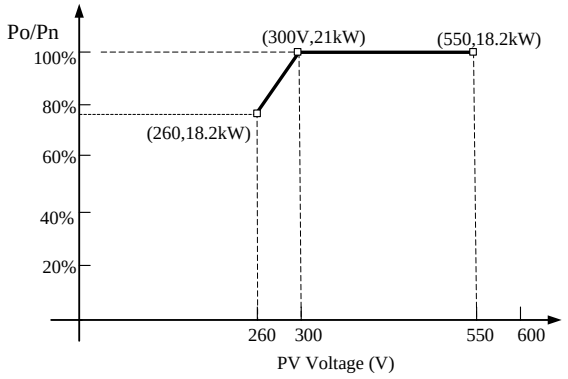


Figure 6-1(a) DC voltage de-rating curve for CPS SC20KTL-DO/US-480

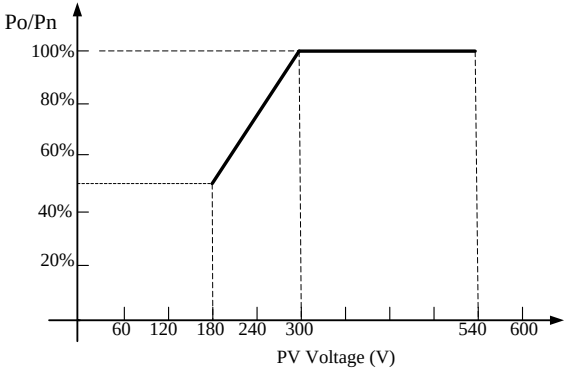


Figure 6-1(b) DC voltage de-rating curve for CPS SC14KTL-DO/US-208

Note[2]: The output power of CPS SC20KTL-DO/US-480 & SC14KTL-DO inverter de-rates when the environmental temperature is higher than 122℉(50℃). (See Figure 6-2)

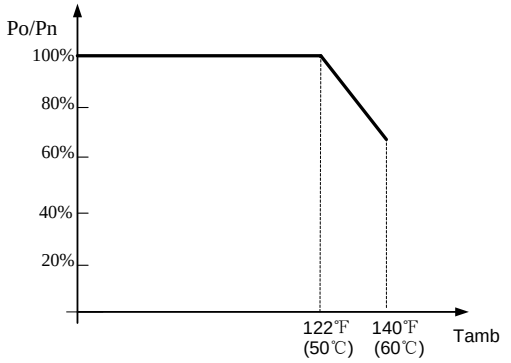


Figure 6-2 Environmental temperature de-rating curve

Note3: When the altitude is higher than 6562ft (2000m), the power of CPS SC20KTL-DO/US-480 & SC14KTL-DO/US-208 inverter needs derating.(see Figure 6-3)

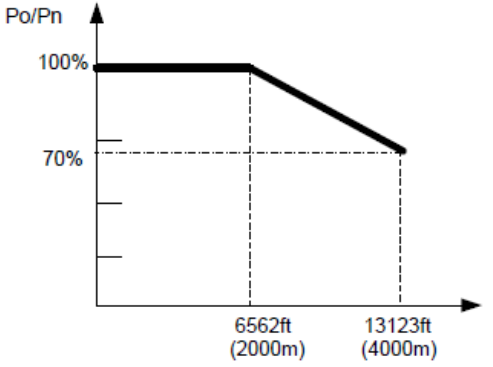


Figure 6-3 Derating curve with high altitude

Chapter 8 Limited Warranty

The warranty policy of this product is specified in the contract; otherwise, the warranty period is 5 years.

For service, Chint Power Systems America will provide local support. For Warranty terms, please refer to the CPS America standard warranty policy in place at time of purchase.

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Richardson, Texas 75081

Service Hotline: 855-584-7168

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CPS SC20KTL-DO/US-480 & SC14KTL-DO Installation and Operation Manual

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